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References

Aktuell

Forte 2018

Brittany L. Forte, *Finding peace with pencil.* science **362** (2018), 714.

I reached for my favorite black pen, eager to begin my annual career development plan—three pages of boxes and lines detailing my vision of what lies ahead after I graduate with a Ph.D. Each of the previous 3 years, I had confidently completed the form in pen. But as I prepared to fill out the form for the fourth time, I hesitated. I had changed during graduate school, and I had to ask myself, "Can I be sure I will stick to the plan?" Having a clear path had offered such reassurance as I worked through the highs and lows of grad school. But this time, I decided, I would set aside the pen and complete the plan in pencil.

Hershkovitz 2018

Israel Hershkovitz et al., *"The earliest modern humans outside Africa", Response to Comment.* science **362** (2018), 411.

Israel Hershkovitz, Mathieu Duval, Rainer Grün, Norbert Mercier, Helene Valladas, Avner Ayalon, Miryam Bar-Matthews, Gerhard W. Weber, Rolf Quam, Yossi Zaidner & Mina Weinstein-Evron

Our original claim, based on three independent numerical dating methods, of an age of ≈185,000 years for the Misliya-1 modern human hemi-maxilla from Mount Carmel, Israel, is little affected by discounting uranium-series dating of adhering crusts. It confirms a much earlier out-of-Africa Homo sapiens expansion than previously suggested by the considerably younger (90,000 to 120,000 years) Skhul/Qafzeh hominins.

Larson 2018

Richard C. Larson, *What are you waiting for?* science **362** (2018), 610.

When I was hired as an assistant professor in 1969, mandatory retirement at age 65 was the law of the land for tenured faculty members. I was 26 years old at the time, so that seemed impossibly far away. But by the time I was 50, two amendments to federal law had removed all age limits. I could stay in my tenured position forever! That's how, in 2011, I found myself still an active professor at the Massachusetts Institute of Technology (MIT) in Cambridge at age 68. I might still be in my tenured job today, if not for a meeting that year with the official who administered my federal research funding.

Lee 2018

Gloria Lee et al., *Testing the retroelement invasion hypothesis for the emergence of the ancestral eukaryotic cell.* PNAS **115** (2018), 12465–12470.

pnas115-12465-Supplement.pdf

Gloria Lee, Nicholas A. Sherer, Neil H. Kim, Ema Rajic, Davneet Kaur, Niko Urriola, K. Michael Martini, Chi Xue, Nigel Goldenfeld & Thomas E. Kuhlman

Phylogenetic evidence suggests that the invasion and proliferation of retroelements, selfish mobile genetic elements that copy and paste themselves within a

host genome, was one of the early evolutionary events in the emergence of eukaryotes. Here we test the effects of this event by determining the pressures retroelements exert on simple genomes. We transferred two retroelements, human LINE-1 and the bacterial group II intron Ll.LtrB, into bacteria, and find that both are functional and detrimental to growth. We find, surprisingly, that retroelement lethality and proliferation are enhanced by the ability to perform eukaryoticlike nonhomologous end-joining (NHEJ) DNA repair. We show that the only stable evolutionary consequence in simple cells is maintenance of retroelements in low numbers, suggesting how retrotransposition rates and costs in early eukaryotes could have been constrained to allow proliferation. Our results suggest that the interplay between NHEJ and retroelements may have played a fundamental and previously unappreciated role in facilitating the proliferation of retroelements, elements of which became the ancestors of the spliceosome components in eukaryotes.

Keywords: retroelements | LINE-1 | introns | evolution | junk DNA

Significance: Phylogenetic evidence suggests that a factor in the emergence of the ancestral eukaryotic cell may have been selection pressure resulting from invasion and proliferation of retroelements. Here we experimentally determine the effects of a retroelement invasion on genetically simple host organisms, and we demonstrate theoretically that the observed effects are sufficient to explain their observed rarity in bacteria. We also show that nonhomologous end-joining (NHEJ), a mechanism of DNA repair found in all extant eukaryotes, but only some bacteria, significantly enhances the efficiency of retrotransposition and the effects of retroelements on the host. We hypothesize that the interplay of NHEJ and retroelements may have played a previously unappreciated role in the evolution of advanced life.

Nielsen 2018

Kathrine Bjerregaard Nielsen, *Putting my grad school angst to use.* science **362** (2018), 494.

My phone rings right when I'm about to leave work, as if the person on the other end has been debating the call all day. On the line is a graduate student. At first they are hesitant to talk, but they loosen up when I assure them their question is reasonable and their dilemma is common. The emotion in their voice makes it clear that just going over university guidelines won't be enough. We talk for about 30 minutes, discussing the details of their research. But I am not the student's supervisor or academic adviser. I am a research integrity officer—and I relate to this anxious voice because, not too long ago, it could have been me.

Pennisi 2018

Elizabeth Pennisi, *Restoring lost grazers could help blunt climate change.* science **362** (2018), 388.

Price 2018

Michael Price, *Giant study links DNA to same-sex experiences.* science **362** (2018), 385–386.

People who reported having at least one same-sex partner are more likely to share certain genetic variants.

"I'm pleased to announce there is no 'gay gene,"' Ganna said. "Rather, 'nonheterosexuality' is in part influenced by many tiny genetic effects."

He added that the four genetic variants could not reliably predict someone's sexual orientation. "There's really no predictive power," he said.

Sharp 2018

Warren D. Sharp & James B. Paces, *Comment on "The earliest modern humans outside Africa"*. science **362** (2018), 411.

Hershkovitz et al. (Reports, 26 January 2018, p. 456) interpreted the Misliya-1 fossil maxilla as evidence of the earliest known anatomically modern human outside Africa. However, the fossil's reported age of 177,000 to 194,000 years relies on flawed interpretations of uranium-series data. We contend that those data support a minimum age of no more than ≈60,000 to 70,000 years.

Amerika

Wade 2018

Lizzie Wade, *Ancient DNA tracks migrations around Americas*. science **362** (2018), 627–628.

Trove of new samples reveals expansion of Clovis hunters and mysterious 9000-year-old population turnover.

Just as mysterious is the trace of Australasian ancestry in some ancient South Americans. Reich and others had previously seen hints of it in living people in the Brazilian Amazon. Now, Willerslev has provided more evidence: telltale DNA in one person from Lagoa Santa in Brazil, who lived 10,400 years ago. "How did it get there? We have no idea," says geneticist José Víctor Moreno-Mayar of the University of Copenhagen, first author of the Willerslev paper. The signal doesn't appear in any other of the team's samples, "somehow leaping over all of North America in a single bound," says co-author and archaeologist David Meltzer of Southern Methodist University in Dallas, Texas. He wonders whether that Australasian ancestry was confined to a small population of Siberian migrants who remained isolated from other Native American ancestors throughout the journey through Beringia and the Americas. That suggests individual groups may have moved into the continents without mixing.

Bibel

Finkelstein 2013

Israel Finkelstein & Benjamin Sass, *The West Semitic Alphabetic Inscriptions, Late Bronze II to Iron IIA, Archeological Context, Distribution and Chronology*. Hebrew Bible and Ancient Israel **2** (2013), 149–220.

The article deals with the chronology and geographic distribution of the Late Bronze II to late Iron IIA alphabetic inscriptions found in the Levant, ca. 1300–800 B.C.E., with an emphasis on the archaeological context. It traces the expansion of the alphabet from its core area in the Shephelah in the Late Bronze age to the rest of the Levant starting in the early Iron IIA, ca. 900 B.C.E., and the parallel development of the alphabet away from Proto-Canaanite.

Energie

Service 2018

Robert F. Service, *Advances in flow batteries promise cheap backup power*. science **362** (2018), 508–509.

Grabung

Elburg 2010

Rengert Elburg, *Der bandkeramische Brunnen von Altscherbitz, Eine Kurzbiografie*. Ausgrabungen in Sachsen **2** (2010), 231–234.

Isotope

McGee 2018

David McGee, *Shifting summer rains*. science **362** (2018), 518–520.

Trace-element records in Chinese caves reveal the effects of climate change on Asian monsoons.

The interpretation of oxygen isotope variations remains uncertain. It was initially argued that these variations (expressed as the 18O/16O ratio, or d18O) reflect changes in the contribution of 18O-depleted summer rains to total annual rainfall outside of the caves. This implies that low d18O values mean more summer rainfall at the cave site (4). At the opposite extreme, others have argued that d18O values in EASM rainfall have no relationship with local rainfall amounts and are instead set by changes in the composition or fraction of water vapor transported into the EASM region from India, where there is preferential rainout (removal from the atmosphere by precipitation) of water vapor with heavy oxygen isotopes (5). In this interpretation, d18O records from Chinese stalagmites provide information about remote atmospheric circulation, but not rainfall over China itself.

Judentum

Fraade 2018

Steven D. Fraade, *Early Rabbinic Midrash between Philo and Qumran*. In: Michael L. Satlow (Hrsg.), *Strength to Strength, Essays in Appreciation of Shaye J. D. Cohen*. (Providence 2018), 281–293.

If I may even more widely generalize, long-lasting and wide-ranging cultural "revolutions" (as I would characterize the rabbinic culture of commentary) are rarely if ever the product of sudden, singular, homogeneous propellants. In short, we need to broaden our comparative gaze(s) in multiple directions. Even so, there will be distinctive features of Tannaitic midrash halakhah (as of the commentaries of Philo and Qumran) that lack clear antecedents or analogues. The broader comparative lens allows us to view both these distinctive and shared features in sharper relief, even if it does not permit us unilinearly to trace the "origins" of midrashic commentary to any one time, place, motivation, or interpretive culture, but to appreciate the rich multiplicity of intersecting and interacting possibilities and their incorporation into a variety of exegetical rhetorical forms and functions.

Klima

Nicewonger 2018

Melinda R. Nicewonger, Murat Aydin, Michael J. Prather & Eric S. Saltzman, *Large changes in biomass burning over the last millennium inferred from paleoatmospheric ethane in polar ice cores*. PNAS **115** (2018), 12413–12418.

pnas115-12413-Supplement.pdf

Biomass burning drives changes in greenhouse gases, climate-forcing aerosols, and global atmospheric chemistry. There is controversy about the magnitude and timing of changes in biomass burning emissions on millennial time scales from preindustrial to present and about the relative importance of climate change and human activities as the underlying cause. Biomass burning is one of two notable sources of ethane in the preindustrial atmosphere. Here, we present ice core ethane measurements from Antarctica and Greenland that contain information about changes in biomass burning emissions since 1000 CE (Common Era). The biomass burning emissions of ethane during the Medieval Period (1000–1500 CE) were higher than present day and declined sharply to a minimum during the cooler Little Ice Age (1600–1800 CE). Assuming that preindustrial atmospheric reactivity and transport were the same as in the modern atmosphere, we estimate that biomass burning emissions decreased by 30 to 45 % from the Medieval Period to the Little Ice Age. The timing and magnitude of this decline in biomass burning emissions is consistent with that inferred from ice core methane stable carbon isotope ratios but inconsistent with histories based on sedimentary charcoal and ice core carbon monoxide measurements. This study demonstrates that biomass burning emissions have exceeded modern levels in the past and may be highly sensitive to changes in climate.

Keywords: ethane | ice cores | biomass burning | geologic hydrocarbons | Little Ice Age

Significance: Biomass burning influences the climate system through direct emissions of aerosols, greenhouse gases, and chemically reactive gases. There is uncertainty and controversy regarding variations in past biomass burning, making it difficult to establish the climate sensitivity of biomass burning in current climate models. This study presents new measurements of ethane in air trapped in polar ice cores. The results indicate that biomass burning emissions exceeded modern levels during the Medieval Period (1000–1500 CE) but then decreased substantially during the Little Ice Age (1600–1800 CE), indicating the sensitivity of biomass burning to climate during the preindustrial era. Such positive feedbacks between biomass burning and climate may make it difficult to achieve societal climate goals.

Trusel 2018

Luke D. Trusel et al., *Nonlinear rise in Greenland runoff in response to post-industrial Arctic warming*. nature **564** (2018), 104–108.

Luke D. Trusel, Sarah B. Das, Matthew B. Osman, Matthew J. Evans, Ben E. Smith, Xavier Fettweis, Joseph R. Mcconnell, Brice P. Y. Noël & Michiel R. Van Den Broeke

The Greenland ice sheet (GrIS) is a growing contributor to global sea-level rise1, with recent ice mass loss dominated by surface meltwater runoff2,3. Satellite observations reveal positive trends in GrIS surface melt extent4, but melt variability, intensity and runoff remain uncertain before the satellite era. Here we present the first continuous, multi-century and observationally constrained record of GrIS surface melt intensity and runoff, revealing that the magnitude of recent GrIS melting is exceptional over at least the last 350 years. We develop this record through stratigraphic analysis of central west Greenland ice cores, and demonstrate that measurements of refrozen melt layers in percolation zone ice cores can be used to quantifiably, and reproducibly, reconstruct past melt rates. We show significant ($P < 0.01$) and spatially extensive correlations between these ice-core-derived melt records and modelled melt rates5,6 and satellite-derived melt duration4 across Greenland more broadly, enabling the reconstruction of past ice-sheet-scale surface melt intensity and runoff. We find that the initiation of increases in GrIS melting

closely follow the onset of industrial-era Arctic warming in the mid-1800s, but that the magnitude of GrIS melting has only recently emerged beyond the range of natural variability. Owing to a nonlinear response of surface melting to increasing summer air temperatures, continued atmospheric warming will lead to rapid increases in GrIS runoff and sea-level contributions.

ZHANG 2018

Hongbin Zhang et al., *East Asian hydroclimate modulated by the position of the westerlies during Termination I.* science **362** (2018), 580–583.

s362-0580-Supplement1.pdf, s362-0580-Supplement2.xlsx

Hongbin Zhang, Michael L. Griffiths, John C. H. Chiang, Wenwen Kong, Shitou Wu, Alyssa Atwood, Junhua Huang, Hai Cheng, Youfeng Ning & Shucheng Xie

Speleothem oxygen isotope records have revolutionized our understanding of the paleo East Asian monsoon, yet there is fundamental disagreement on what they represent in terms of the hydroclimate changes. We report a multiproxy speleothem record of monsoon evolution during the last deglaciation from the middle Yangtze region, which indicates a wetter central eastern China during North Atlantic cooling episodes, despite the oxygen isotopic record suggesting a weaker monsoon. We show that this apparent contradiction can be resolved if the changes are interpreted as a lengthening of the Meiyu rains and shortened post-Meiyu stage, in accordance with a recent hypothesis. Model simulations support this interpretation and further reveal the role of the westerlies in communicating the North Atlantic influence to the East Asian climate.

Neolithikum

HOHLE 2017

Isabel Hohle, *Social dynamics and mobility*, *Discussing 'households' in Linear Pottery Culture research (6 ML BC).* In: CAROLINE HEITZ & REGINE STAPFER (Hrsg.), *Mobility and Pottery Production, Archaeological & Anthropological Perspectives.* (Leiden 2017), 115–140.

This contribution introduces an ongoing PhD project at the University of Cologne1 that examines 'linear pottery culture' ('Linearbandkeramik' short: LBK) settlement structure and the social organisation of the site of Schkeuditz-Altscherbitz in north-west Saxony (DE). Of special interest is the definition, usage and examination of 'households' in LBK research. While highlighting various aspects of LBK research and giving an overview of the project, some thoughts and ideas about the 'household archaeology' of the LBK are discussed. Studies from anthropology have shown how different households can be in terms of composition and function, even within one society. The attempt to deconstruct models that are informed by underlying notions of stability, homogeneity and correspondence – as between houses, households and families – is taken here as a first step to open the path for investigating more dynamic phenomena: e.g. intra-site activities, or supra-regional networks that might have existed in those societies and which were linked to different forms of spatial mobility. These preliminary ideas and thoughts do not claim completion and are better seen as a rag rug.

Keywords: pottery | houses | households | terminology | spatial organisation

Sprachlehre

Rosenthal 1961
Franz Rosenthal, *A Grammar of Biblical Aramaic*. Porta Linguarum Orientalum NS 5 (Wiesbaden 1961).